

Message..

James Burtie

From: Anh Wride
 Sent: Wednesday, April 28, 2004 12:45 PM
 To: 'flynch@nc.rr.com'
 Cc: James Burtie; Riley Hollingsworth; Raymond Laforge
 Subject: Response to your email on BPL

Mr. Lynch:
 This message is in response to your email dated April 13, 2004, addressed to various FCC personnel. The response to each question is provided in CAPS and BLACK BOLD font below. Thank you for taking the time to write to the FCC. If you have any other question, please do not hesitate to email us.

Anh Wride
 FCC OET

-----Original Message-----

From: Frank A. Lynch [mailto:flynch@nc.rr.com]
 Sent: Tuesday, April 13, 2004 2:58 PM
 To: Riley Hollingsworth; Raymond Laforge; James Burtie
 Cc: Gary Pearce; Tom Brown; Frank A. Lynch
 Subject: Progress Energy Interference Complaints - Who should these be directed to?

The local amateur radio community, land mobile, and other interested users of the 2 MHz to 50 MHz spectrum in and around the Progress Energy BPL trial in southern Wake County, would like a determination from the FCC, to whom interference complaints are to be addressed.

RESPONSE: THE POWER COMPANY SHOULD BE THE FIRST ONE TO BE CONTACTED FOR ANY INTERFERENCE COMPLAINT. THE FCC SHOULD BE INVOLVED ONLY IF INTERFERENCE PROBLEMS REMAIN AFTER THE BPL OPERATOR HAS BEEN CONTACTED AND AFFORDED THE OPPORTUNITY TO TAKE CORRECTIVE ACTIONS.

Initially we (the Amateur Radio Community) were told that since Progress Energy had an experimental license, that the Experimental Licensing Division of the Office of Engineering and Technology was responsible for those complaints.

Through some investigation on my part, I have learned that both of the current trial areas are outside the 20 km radius specified in WD2CXA;

Within a 20 km radius of Raleigh (WAKE), NC - NL 35-56-58; WL 78-34-23

Furthermore, queries to Progress Energy's Bill Godwin also indicated that it was his understanding that the Experimental license was only for the initial "Phase I" trial in Wakefield Plantation in northern Wake County.

That implies, does it not, that the Amperion equipment in the Southern Wake County has now achieved Part 15 compliance by either (a) Verification, (b) Declaration of Conformity, or (c) Certification. If not they would be operating with non-type accepted equipment, correct?

RESPONSE: IF THE EQUIPMENT IS COMPLIANT WITH PART 15, IT MAY BE DEPLOYED. CARRIER CURRENT SYSTEMS AND BPL ARE COVERED UNDER OUR VERIFICATION PROCEDURE. THE FCC OFFICE

OF ENGINEERING AND TECHNOLOGY(OET) HAS HAD DISCUSSIONS WITH AMPERION AND HAS LOOKED AT TEST DATA FROM AMPERION BPL DEVICES INDICATING COMPLIANCE WITH PART 15.

Does this now mean that responsibility for interference complaints falls on the FCC Enforcement Bureau? We are anxious to get some resolution to interference in the amateur radio bands. While Progress has attempted to "move" and "notch" spectrum around the amateur radio bands, they have not been entirely successful in doing so. A full report of the April 6, 2004 activity with Progress Energy, Tom Brown N4TAB, and Gary Pearce KN4AQ is available on the ARRL web page at <http://www.arrl.org/news/stories/2004/04/08/3/?nc=1>

RESPONSE: THE POWER COMPANIES MUST BE GIVEN A CHANCE TO ADDRESS ANY SUBSTANTIATED INTERFERENCE COMPLAINT BECAUSE THIS IS THE FASTEST AND MOST EFFICIENT WAY TO MITIGATE ANY POTENTIAL INTERFERENCE. SO FAR, IT APPEARS THAT PROGRESS ENERGY IS WORKING DILIGENTLY IN ADDRESSING EACH CASE OF INTERFERENCE CAUSED BY BPL, HOWEVER, OET WILL CONTINUE TO ADDRESS INTERFERENCE COMPLAINTS.

Finally, isn't it true that even for verified equipment (which is probably the type of certification that would have been done on this equipment), that someone at the FCC has a test report.

RESPONSE: NO, IF THE EQUIPMENT FALLS UNDER THE VERIFICATION PROCEDURE, THE MANUFACTURER KEEPS A COPY OF THE TEST REPORT, NOT THE FCC. HOWEVER, AS INDICATED ABOVE, OET HAS HAD DISCUSSIONS WITH AMPERION AND OET HAS LOOKED AT TEST DATA FROM AMPERION BPL DEVICES INDICATING COMPLIANCE WITH PART 15.

In reviewing the data submitted against the experimental license, I note that a FCC Part 15B report was submitted. The copy that is on the FCC's public experimental licensing site has had all the pertinent test results removed from it. Would it be possible to get a copy of the full report for use in preparing comments to the NPRM?

RESPONSE: IT APPEARS THAT THE TEST RESULT PAGES IN THE TEST REPORT SUBMITTED BY AMPERION WERE BLANK AS A RESULT OF A TRANSMISSION ERROR. OET IS REQUESTING THE MISSING PAGES FROM AMPERION AND THE MISSING INFORMATION WILL BE UPLOADED TO OUR WEB SITE WHEN RECEIVED.

We also note that equipment we have looked at on the overhead spans and equipment that was photographed by the press during Chairman Powell's visit in March, doesn't appear to have the required identification as per the FCC rules;

Sec. 2.954 Identification.

Devices subject only to verification shall be uniquely identified by the person responsible for marketing or importing the equipment within the United States. However, the identification shall not be of a format which could be confused with the FCC Identifier required on certified, notified or type accepted equipment. The importer or manufacturer shall maintain adequate identification records to facilitate positive identification for each verified device.

Sec. 15.19 Labeling requirements.

(a) In addition to the requirements in part 2 of this chapter, a device subject to certification, or verification shall be labeled as follows:

(3) All other devices shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

RESPONSE: UNDER SEC. 2.954, EQUIPMENT SUBJECT TO VERIFICATION MUST BE APPROPRIATELY LABELED AS STATED IN YOUR EMAIL. OET HAS CONTACTED AMPERION AS TO THE LABELING OF ITS BPL EQUIPMENT. AMPERION RESPONDS THAT ITS EQUIPMENT ARE APPROPRIATELY LABELED, HOWEVER, THESE LABELS ARE NOT VISIBLE AFTER INSTALLATION IN UNDERGROUND INSTALLATIONS AS A USER-SUPPLIED OUTER ENCLOSURE IS EMPLOYED. THE LABELS ARE HOWEVER VISIBLE ON OVERHEAD INSTALLATIONS BUT MAY NOT BE LEGIBLE OVER 30 FEET IN THE AIR.

I look forward to hearing from you on this matter.

Frank A. Lynch, W4FAL
ARRL NC Technical Specialist,
2528 Oakes Plantation Drive
Raleigh, NC 27610-9328
919-740-3957
w4fal@smithchart.org

Alan Stillwell

From: James Burtle
Sent: Wednesday, May 05, 2004 10:22 AM
To: Alan Stillwell; Anh Wride; Bruce Franca; Bruce Romano
Subject: FW: Interference Complaint Regarding your BPL System

3 Sketches Penn II

-----Original Message-----

From: Anthony, Len [mailto:Len.S.Anthony@pgnmail.com]
Sent: Sunday, April 25, 2004 11:07 AM
To: James Burtle
Subject: FW: Interference Complaint Regarding your BPL System

Once I receive the additional information Progress will evaluate Mr. Penn's allegations.
Len

-----Original Message-----

From: Anthony, Len
Sent: Sun 4/25/2004 10:38 AM
To: Fletch; Len Anthony (E-mail); Godwin, Bill; Oja, Matt; James.Burtle@fcc.com; Manning, Marsha
Cc: Alan R. Stillwell (E-mail); Anh Wride (E-mail); Ed Hare (E-mail); Frank A. Lynch (E-mail); James R. Burtle (E-mail); Riley Hollingsworth (E-mail); Dennis Rysell (E-mail); Gary Pearce (E-mail)
Subject: RE: Interference Complaint Regarding your BPL System

Thank you for your e-mail. Please forward to me all details regarding your April 18 experience. Please include all information regarding the exact locations where the interference allegedly occurred, the type of equipment you were using, details as to how you measured distances, witnesses to the events, who you tried to communicate with during your tests, how you determined that the interference was caused by Progress Energy's BPL system, efforts you made to mitigate the interference, what prompted you to do the tests, how you decided where to go, others you consulted with prior performing the tests, etc.
Len

-----Original Message-----

From: Fletch [mailto:visualsystems@nc.rr.com]
Sent: Sat 4/24/2004 3:21 PM
To: Len Anthony (E-mail)
Cc: Alan R. Stillwell (E-mail); Anh Wride (E-mail); Ed Hare (E-mail); Frank A. Lynch (E-mail); James R. Burtle (E-mail); Riley Hollingsworth (E-mail); Dennis Rysell (E-mail); Gary Pearce (E-mail)
Subject: Interference Complaint Regarding your BPL System

Hi Len,

I am making a formal complaint of interference from your BPL Test Site in Fuquay Varina, NC.

On Sunday, April 18th, 2004, I drove into the Fuquay Varina area with my friend, Dennis Rysell, KG4HJO, to better understand the extent of BPL signals from your system. We heard high levels of noise, S9 and over, on a wide section of frequencies.

We noted BPL signals from 14.300 MHz to 28.100 MHz. The 15 and 17 meter bands were "notched" out, but we could still detect some signals.

Please note: 14.300MHz to 14.350MHz is in the Amateur Radio band and your signals were very noticeable, and HARMFUL to my communications.

In other words, these frequencies were unusable for any communications work. The BPL Signals were S9 within 2,000 feet of the power lines.

this is Harmful Interference and should be resolved ASAP.

was operating mobile, as I often do, and noted the signals persisted for at least 1 mile within the Fuquay Varina area. Since Progress Energy just published a letter to the FCC proclaiming this is the best you can do, that means these frequencies are no longer usable for amateur Radio operators. ==>This is a violation of the Part 15 regulations under which your BPL system is deployed.

More importantly, once your systems are deployed over a wider area, I will not be able to "Drive out" of the area. Therefore, mobile operation of Amateur Radio Stations is important and must be considered in your Interference Mitigation. In addition, Amateur Radio Operators are often Mobile when being the "First Responders" to an emergency situation or involved in Homeland Security. Is your BPL System revenue more important than a human life?

My call, N4JZO, was issued by the FCC granting me a licensed right to use these frequencies. Your BPL service is a Part 15 device and according to regulations, "may not cause harmful interference to licensed services". Since you are causing Harmful Interference to me, and other licensed Radio Amateurs, and you claim you can do nothing further to correct the interference, I demand you shut your BPL Service down immediately.

The equipment I used for my testing included:
Icom IC706-MKIIg
Simple wire vertical
SGC-239 Autotuner

Please note the use of a simple vertical. A better antenna would have detected even more noise.

For your reference, a key location where we detected high BPL signals was in the parking lot of a Food Lion at GPS coordinates:
N 35 degrees 36.255' , W 78 degrees, 48.172'
This location is over 600 feet from the power lines.

FYI: In addition to being a Licensed Radio Amateur for over 28 years, I am also an Electrical Engineer (BSEE), professional Software Developer, and Small Business Owner. IOW, I have extensive experience with Radio Frequency devices, and electronics.

Sincerely,

J. Fletcher Penn II
BSEE, MCSD, MCP
Visual Systems & Support Inc.
5013 Wood Valley Drive
Raleigh, NC 27613
Phone: (919) 518-0658
Mobile: (919) 417-1870
visualsystems@nc.rr.com
<http://www.visualsystemsandsupport.com> <<http://www.visualsystemsandsupport.com>>
<http://www.moonbeamlights.com> <<http://www.moonbeamlights.com>>

James Burtle

From: Tom Brown N4TAB [n4tab@earthlink.net]
Sent: Tuesday, May 11, 2004 3:12 PM
To: James Burtle; Alan Stillwell; Bruce Franca; Riley Hollingsworth; Anh Wride; Len.S.Anthony@pgnmail.com; matt.oja@pgnmail.com; bill.godwin@pgnmail.com; W3KD@aol.com
Cc: Gary Pearce KN4AQ; John Covington, W4CC; Ed Hare W1RFI; dsumner@arrl.org; danny hampton K4ITL
Subject: RESEND - May 11, 2004 - RE: Formal complaint - Progress Energy Part 15 devices

To:
 James Burtle, FCC
 Alan Stillwell, FCC
 Anh Wride, FCC
 Riley Hollingsworth, FCC
 Len Anthony, Progress Energy Corporation
 Matt Oja, Progress Energy Corporation
 Bill Godwin, Progress Energy Corporation
 Chris Imlay, ARRL Counsel

Date: May 5, 2004

On April 27, 2004, I submitted, via email, a Formal Complaint regarding harmful interference produced by and emanating from, Part 15 devices and their connected/interconnected wiring), operated by Progress Energy Corporation in Wake County, NC. In that complaint, I gave details of the interference and the method of observation. I believe that my observations and the reporting thereof, were and are sufficient to cause the initiation of an Enforcement action by the FCC. As of today, I have received no answer or reply.

Therefore, I inquire:

- 1) was my complaint received?
- 2) please advise the FCC case number/action number assigned for my records and for use in follow-on correspondence
- 3) please advise of any action taken to date and
- 4) if no action has been taken, please indicate when I might expect action to be taken

Respectfully,

Thomas A. Brown Amateur Radio licensee N4TAB
 5525 Old Still Rd.
 Wake Forest, NC
 919-556-8477 (w)
 919-528-3104 (h)
n4tab@earthlink.net

James Burtie

From: Gary Pearce KN4AQ [kn4aq@arrl.net]
Sent: Wednesday, May 12, 2004 4:56 PM
To: Len Anthony
Cc: Anh Wride; James Burtie; w1rfi@arrl.org; w4fal@smithchart.org; Bill Godwin; Riley Hollingsworth
Subject: 3rd Interference Complaint regarding Progress Energy Phase II BPL Interference
To: Len Anthony, Progress Energy Regulatory Affairs

From: Gary Pearce KN4AQ
116 Waterfall Ct.
Gary, NC 27513
919-380-9944
kn4aq@arrl.net

CC:
Bill Godwin, Progress Energy
Anh Wride, FCC
James R. Burtie, FCC
Riley Hollingsworth, FCC (FYI)
Ed Hare, ARRL
Frank A. Lynch, ARRL

Thursday, May 12, 2004

This e-mail letter is my third formal complaint of interference received from several Broadband over Power Line (BPL) installations operated by Progress Energy in the Wake County, North Carolina area. This complaint covers the continuation of interference noted in my second complaint, filed March 29, 2004. This interference has not been addressed as of May 4th, 2004, notwithstanding the claim in your April 20th e-mail to James Burtie that, "Since that time, further modifications have been made to address this fringe interference." (My complaints #1 and #2 are included at the end of this e-mail, for convenient reference.)

Before detailing the interference I monitored on May 4th, I must address the question of "what is harmful interference" in general, and the question of harmful interference to mobile operation, which you dismissed in your April 20th e-mail.

First, the question of harmful interference. Amateur radio operators frequently operate at the margins of signal strength and quality. Signal strengths so weak that other services would consider them unusable are used routinely for amateur radio communication. We also tune across spectrum that contains no signals at all, looking for stations to contact. In our receivers, in the single sideband (voice) mode, your continuous series of BPL carriers appear as an always-present series of audio tones. The pitch of the tones depends on the exact frequency tuned, but there is always a tone somewhere in the prime spectrum for communications-quality audio, between 500 and 2500 Hz.

is "seriously degrades" our radio communications service whether desired signals are being completely obscured or not.

s, this means that interference just above the ambient noise level at any even amateur radio station is harmful, as it changes the routine nature of operation that we have enjoyed since shortly after the dawn of radio. You are tempting to overlay a second, unlicensed radio service atop the spectrum located to a licensed service using Part 15 Rules that were never intended to apply to signals of this combination of coverage and duration. We will have no complaint if there is truly no interference, if that can be accomplished. The technology you have deployed today does not come close to meeting that goal.

Second, mobile operation is a perfectly valid form of amateur radio communication, and interference to it is no more acceptable than interference to fixed operation. The ability to drive away from interference may be an option for a mobile operator, but that does not remove the Part 15 liability of the operator of an unlicensed device to avoid harmful interference, for several reasons. The mobile operator may drive in and out of multiple interference zones as he or she travels down the road. The mobile operator may be in heavy traffic, or may be stopped by a traffic light, and what would be a minute of interference at 35 mph could extend to several minutes. And the mobile operator may stop in a driveway or parking lot for an extended period inside an interference zone. With no practical way to immediately mitigate this interference, the mobile operation will be seriously degraded.

In addition, keep in mind that you are operating small trials in neighborhoods where there are no amateur radio operators. In these neighborhoods, we use mobiles as surrogates for fixed stations. In this role, the mobiles have a serious handicap. Their inefficient antennas do not permit reception of BPL signals at anywhere near the distances that even simple dipole antennas at fixed stations do. To be specific, when driving away, perpendicular to the active overhead power line, the BPL signal fades to inaudible in 400 to 500 feet (not, by the way, the 90 feet Progress Energy suggested in comments on the Docket 04-37 NPRM). However, home stations, using dipole antennas, can hear the signals well as much as a mile away. Danny Hampton K4ITL lives on Rock Service Station Road, just north of Pagan Road, eight-tenths of a mile from the extractor on Holland Church Road near Feldman Road. In our January 15th observation (and many times since), he was able to hear the signal on that overhead line using a dipole antenna.

So to summarize these points, weak signals can and do create harmful interference, mobile stations are fully legitimate targets for harmful interference, and we are using mobiles to provide observations that would otherwise be available if there were any hams living in the trial areas.

Now, on to my May 4th observations.

On May 4th, I positioned my mobile amateur radio station at the intersection of Holland Church Road and Elsie Lorraine Road, at the entrance to the Holland Meadows subdivision. This is near the power line used for BPL feeding the

neighborhood.

received signals with the Amperion "BPL signature" (mostly unmodulated carriers, 1.1 kHz apart, covering a large, continuous block of spectrum) from 14.195 to 21.45 MHz, including all or parts of the 20, 17 and 15-meter amateur bands. Within those overall limits, the BPL signal was strong on most frequencies, but there were some frequencies where the signal was fairly weak.

The signals from 14.195 to 14.290 were weak, but plainly audible above the ambient noise level. These are some of the "fringe" signals you refer to in our April 20th e-mail. I monitored several amateur radio transmissions in this spectrum, and while the signals did not obliterate any, they did present an annoying, continuous tone behind all of them on my single-sideband receiver.

The signals from 14.290 to 14.350, covering the top 60 kHz of the 20-meter amateur radio band, were "full strength," reaching "S-7" on my Icom 706 MKIIG transceiver and Outbacker Perth Plus antenna while on the highway adjacent to the power line. This is the same signal block I noted in my March 29, 2004 complaint. I have observed that signal block on April 6th (a demonstration with Bill Godwin), April 13th, April 21st, and April 29th, in addition to May 4th. It has not changed. It continues to be strong enough to make reception of weak and moderately strong amateur radio signals impossible.

The BPL signals continue full-strength through the 15.10-15.80 MHz and 17.50-17.90 MHz shortwave broadcast bands, and covered up some of the weaker stations while putting an annoying, continuous whistle (heterodyne) against some stronger signals.

The BPL signal does dip to just above the noise level in the 16.80 - 17.34 area. I believe this is the crossover area between downlink and uplink signals on this leg of power line.

The signal is also weaker from 18.075 - 18.185. This is the notch for the 17-meter amateur radio band. However, the signal is full strength in the bottom 7 kHz of the band, from 18.068, to 18.075. And the BPL signal continues to be clearly readable, though weak, throughout the band. In other words, the notch depth is not great enough to remove the signal completely when it is "S-7" outside the notch. It remains strong enough to obscure a weak ham signal, and presents a continuous, annoying heterodyne behind stronger signals. It also presents the usual, continuous series of carriers when tuning across unused frequencies while looking for stations to contact.

I estimate that a home station would get an audible signal as far as two blocks away. A ham on a lot within a half block of the line would get a fairly strong signal. And this is the configuration I assume you would plan for the power lines in every neighborhood.

Inside the Holland Meadows neighborhood, where BPL is carried on underground power lines, the signals are weaker than those on the overhead lines. But they are still plainly audible and often much stronger than the "fringe" and

notched" signals on the overhead lines in the vicinity of the above-ground pedestals. At 1141 Feldman, I received signals from 2.5 MHz to 5.0 MHz, and from 5.95 MHz to about 9.7 MHz. This put full-strength signals across the 80 and 40-meter ham bands. I estimate that a home station would be able to hear these signals for a block or two as well. At 5528 Holland Church Rd, I received signals from a pedestal from about 6.35 to above 8.3 MHz, including all strength signals across the entire 40-meter band.

In the Woodchase neighborhood, in Fuquay-Varina, I parked along James Slaughter Road, just south of the entrance to the subdivision, on the west side of the road. The total spectrum in use here ran from 21.20 to 28.1 MHz, with a notch for the 12-meter ham band, and a crossover around 25 MHz.

From 21.2 to 21.47 MHz, the signal slowly ramps up in amplitude, with plainly audible signals in the 15-meter band from 21.35 to 21.45 MHz. At 21.47 MHz it jumps to full strength, interfering with a few shortwave broadcast signals in the 21.45 to 21.75 MHz range. The BPL signals fall off below the bottom of the 2-meter band, at 24.86, and remain weak to 25.20, where they became inaudible. Once again, the BPL signals were weak but audible throughout the entire 12-meter band. They fall off just below the 10-meter band at 28.0 MHz, but weak signals remain audible for another 100 kHz inside the ham band.

It would appear from the fact that the top 60 kHz of the 20-meter band and the bottom 7 kHz of the 17-meter band still have full-strength BPL carriers in them that this hardware is not that easy to control. The "fringe" carriers, and the signals remaining in the notched segments, suggest that it can't be just turned on and off where you want, at will, or controlled to the level that you (and we) might desire.

Progress Energy has obviously paid attention to our complaints, and taken steps to correct the problems that we've pointed out. Those steps have fallen short, both by leaving full-strength signals on parts of two Amateur Radio bands, and by leaving weak "fringe" or notched signals on other bands. Rather than dispute our claims, I suggest you take our information to your vendor and ask why they can't make the hardware perform to the level claimed.

We disagree on the definition of "harmful interference" a critical point on which the FCC or a court will make the final determination. I can assure you that the Amateur Radio and shortwave listening communities will work hard to protect continued access to the radio spectrum without the ever present beat of a BPL signal in either the foreground or background of our receivers.

Sincerely,

Gary Pearce KN4AQ

Gary Pearce KN4AQ, March 29, 2004 complaint, for reference

-380-9944

nday, March 29, 2004

is e-mail letter is a second formal complaint of interference received from several Broadband over Power Line (BPL) installations operated by Progress Energy in the Wake County, North Carolina area. This complaint covers interference on NEW frequencies that was not present in my first complaint filed on March 13th.

my March 13th complaint I detailed interference that I observed while operating my mobile amateur radio equipment in the vicinity of the Progress Energy Phase II BPL trial areas in southern Wake County, North Carolina. No one from either Progress Energy or the FCC has contacted me as a result of that complaint (except a request from the FCC to drop David Solomon from the recipient list, which I have done). I have seen Bill Godwin in a somewhat chance encounter at the Holland Church site, and we had a good discussion on the state of the trial.

I have observed that Progress Energy has changed the spectrum used for the overhead line segments in both trial areas. I'm correctly assuming that this was done to respond to complaints, and demonstrate frequency agility and the ability to mitigate interference by avoiding amateur radio spectrum, the attempt is appreciated, but it was not completely successful. New amateur radio and shortwave spectrum is now receiving interference, and that is the basis of this complaint.

On March 20, 2004, in the Woodchase subdivision area near Fuquay-Varina, where BPL signals had covered the 12 and 10 meter bands, I observed clear, strong BPL signature signals from 21.5 to 24.90 MHz, and 25.49 to 28.0 MHz. This almost cleared amateur radio spectrum, but not quite.

The lower segment, from 21.50 to 24.90 MHz, encroached clearly on the bottom 10 kHz of the 12 meter band, from 4.89 to 24.90 MHz, and what I'll call "residual" BPL carriers - carriers at the edge of the main spectrum that trail off in amplitude over the course of 10 to 20 kHz - encroached further. The residual carriers present a correspondingly decreasing problem of interference, but when the bulk of the BPL carriers are strong, the residual carriers can also interfere with weak amateur radio signals.

Note that if a BPL operator is attempting to place a BPL block adjacent to the bottom of an amateur band, they should be aware that these residual carriers will fall across an area of extreme interest where amateurs use Morse code to communicate with distant, often very weak, amateurs in remote parts of the globe. Additional care should be taken to avoid letting this "residual" interference cross the bottom few kHz of any amateur band.

The higher segment, from 25.49 to 28.0 MHz, also left some residual carriers encroaching on the bottom of the 10 meter band at 28 MHz. The main carriers did cover all 40 CB channels and interfered with signals I monitored there.

Then I drove through the Holland Church Road trial site and observed no change since my March 13th complaint - the BPL signals still covered the 12 and 10 meter ham bands and adjacent spectrum.

On March 23, 2004, I returned to the Holland Church Road trial area. That's when I ran into Bill Godwin and two other Progress Energy engineers, observing and reporting on some difficulty that Amerperion was having moving the spectrum on the overhead line. The signals were gone from the 12 and 10 meter bands, and appeared erratically elsewhere. Since this was an effort in progress, I didn't worry about the signals I received.

On March 28, 2004, I returned to the Holland Church site again. This time I monitored signals on the following spectrum blocks:

29 - 16.805 MHz
 33 - 21.00 MHz
 53 - 28.00 MHz (with 12 meter notch?)

ception was somewhat difficult because of a high general noise level (what we usually refer to as "power line noise," nically in this case. The true source of this particular noise is unknown). The BPL signature signals were generally ong and clear above this noise.

ter observing what appeared to be an attempt to completely avoid amateur radio spectrum at the Woodchase trial ea, I was disappointed to see that two busy amateur radio bands were partially or fully covered here: 20 and 17 eters. The BPL carriers interfered with many signals as I tuned from 14.29 to the band-edge of 14.35 MHz in the 20 eter band. Strong signals were audible, but BPL carriers placed a loud "beat note" behind them, making reception itating at best. Weaker signals were rendered unreadable.

had the same situation across the entire 17 meter band, from 18.068 to 18.168 MHz. Weaker signals were impossible , receive, while stronger ones were accompanied by a loud heterodyne whistle.

also tried listening to some shortwave broadcast signals in the spectrum immediately above the 20 meter ham band. witching to AM reception with a 6 kHz band pass filter, I noticed that the BPL signals were a continuous "blanket" cross the spectrum. Since the BPL carriers were 1.1 kHz apart, I heard the expected 1.1 kHz heterodyne tone as part f that interference blanket.

The 15 MHz signal from WWV was completely inaudible. Stronger shortwave signals were audible with varying legrees of interference. Weaker signals on 15.160, 15.205, 15.300, and 15.350 MHz were detectable but not readable. This was just a brief sample of the many shortwave signals that received interference from the BPL energy.

I could not observe any "residual" carriers spilling into the 15 meter ham band as the "power line noise" made it difficult to hear the weakest BPL carriers. With some difficulty I observed what appeared to be a notch in the 24.53 - 28.0 MHz block. The carriers were at least attenuated in the 24.89 - 24.99 MHz area (the 12 meter ham band), but I thought I could hear some weaker carriers through the "power line noise".

That is my report. I'll repeat my contention from my first complaint that interference reports from mobile stations are warranted because:

- amateur radio is a very mobile radio service,
- these are very limited trial areas, and the experience and results must be extrapolated to predict the effect BPL will have if widely deployed in densely populated areas.

I'll conclude with an example of truly random interference caused by BPL to a mobile ham who was not part of, or recruited by, our investigation team:

Over the past few weeks I've had an e-mail exchange with Andy Stoy K4MTN, from Wake Forest, NC. Initially, Andy's e-mail sounded like many that Tom Brown N4TAB, Frank Lynch W4FAL and I have received from area hams who suspect that they are hearing BPL interference from areas where none is known to exist. Andy said he had been hearing loud interference - he called it "static" - for months along a half-mile stretch of Falls of the Neuse Road near the Woodfield subdivision. He was describing the Phase I trial area which we believed to have been disconnected, and his description of "static" didn't sound like the BPL signature we're used to.

I pressed him for more specific details, and he finally described the exact location, and the signature sound (closer-spaced carriers with a clicking sound) of Amperion's BPL. Tom Brown traveled to the site and confirmed that the

ase I equipment was still operating on the overhead line along Falls of the Neuse Rd. Andy traveled that route daily, and regularly operates on the 10 meter band. He had been receiving interference and loss of communications on that stretch of road since at least last fall, but didn't know what caused the problem until we began publicizing the trials. When he contacted us. He will be filing his own report of interference.

Andy's story may seem isolated, a rare, chance occurrence. It is significant for several reasons. One is that it happened all, since there is a total of less than two miles of BPL coverage along Wake County highways. Another is that hams don't know what BPL is yet. We've reached a few with our message, but many more have never heard of it. So there may be a few more Andy Stoy's out there who have passed through the existing trials areas, received interference, and don't know what it was or who to call.

I appreciate the fact that Progress Energy and Ameripion are responding to our reports and complaints of interference. I prefer to just call them "reports," but public proclamations that "there have been no interference complaints" have pushed us to this formal posture. My goal is to make you (Progress Energy and the FCC) aware of the real conditions for radio amateurs and other HF spectrum users in the trial area so that you can anticipate the level of difficulty you can expect in a broader implementation.

I don't expect that Progress Energy and Ameripion could completely avoid amateur radio spectrum in the overhead segments of this limited trial area. I'm surprised that after the first complaints, you moved to occupy different amateur radio spectrum. But even if you had completely missed ham bands in this first move, success in this limited arena is not a good predictor of the ability to mitigate interference in a full system, where you will be constrained to use more spectrum and not re-use spectrum for several line segments. And the question of interference from the underground line segments has not been addressed at all.

Sincerely,

Gary Pearce KN4AQ

Gary Pearce KN4AQ's March 13, 2004 complaint, for reference

I encountered all of this interference while mobile, or visiting the stations of other amateur radio operators. I do not hear any BPL interference at my home in Cary at this time.

November 16, 2003. I first encountered BPL interference on this date, near the Wakefield subdivision in north Raleigh, along Falls of the Neuse Road near Wakefield Pines Rd. The interference appeared as a series of closely spaced RF carriers, approximately 1 kHz apart, covering the lower half of the 10 meter amateur radio band, from 28 to near 29 MHz (and some spectrum below that band, including the 40 CB radio channels near 27 MHz). Some of the carriers had a little "tik-tik-tik" sound at about a 2 Hz rate. The interference was strong - S-9 - for about a half mile along Falls of the Neuse Road, and obliterated several amateur radio signals that I was monitoring.

I understand this was the Phase I trial area, and the test has been discontinued.

January 15, 2004. On this and several subsequent dates, I received interference while driving along Holland Church road between 1010 Road and Pagan Rd. in southern Wake County, specifically in the vicinity of Feldman Dr. The signature of the interference was the same: closely spaced carriers, about 1 kHz apart, some with a tik-tik-tik modulation, and occasionally a longer burst of what sounded like data. The interference covered two blocks of spectrum, from 23.44 - 26.08 MHz (including the amateur radio 12 meter band) and 27.9 - 31.7 MHz, (including the amateur radio 10 meter band). The interference was strong - S-9 - for about a half mile along Holland Church road,

and audible in places along Pagan Rd. It obliterated several amateur radio signals that I was monitoring as I drove through the area.

I also received interference with the same signature in several spots along Feldman Dr., in various other segments of the high-frequency spectrum - near 11 and 15 MHz in particular. The signals were weaker, but plainly audible. Once I used a "beat note" against the 15 MHz WWV time and frequency reference signal.

I have subsequently been through this area several times, and the interference is still present. My last visit was on February 28th.

February 20, 2004. On this and several subsequent dates, I received interference while driving along NC Highway 55 and James Slaughter Rd, just north of the town of Fuquay-Varina. The interference was strongest along James Slaughter Road, opposite the Woodchase subdivision. Again, the signature of the interference was RF carriers, about 1 Hz apart, with a bit of digital modulation now and then, including the tik-tik-tik at about a 2 Hz rate.

This interference was across 21.9-25.7 MHz (including the amateur radio 12 meter band) and 27.5-30.0 MHz (including the amateur radio 10 meter band). The interference was S-9 along James Slaughter Road, and S-5 in the Wood Lion parking lot at NC-55, and obliterated several amateur radio signals that I was monitoring.

In the Woodchase subdivision, I also heard the "BPL signature" signals on several other points in the high frequency spectrum. The signals were weaker, but plainly audible. I also heard signals in the 7 and 24.5 MHz area about a mile further north on James Slaughter Road, near the Whitehurst subdivision. These signals were S-6 to S-9 for about 1/4 mile along James Slaughter Road.

I most recently heard this interference on March 5th, 2004.

Finally, on February 28, 2004, I personally visited the homes of three amateur radio operators who live in the vicinity of the Progress Energy Phase II BPL trials, and observed interference as received at their stations as follows:

Mike Payne KM4UT
5813 HEATHILL CT
Raleigh, NC

Mike lives .7 miles south of the trial site on Holland Church Road. He is using a dipole antenna at about 30 feet. I observed that he was receiving a clear but weak BPL "signature" in the top half of the 10 meter band, above 28.8 MHz, and many smaller clusters of individual carriers in the band below that.

Ted Root N1UJ
509 WYNDHAM DR
Fuquay-Varina, NC

Ted is about a half mile southwest of the James Slaughter Road site. He is also using a dipole antenna at about 40 feet. He was receiving weak but clear BPL signature signals across the 25 and 28 MHz areas.

Roland Erickson WA0AFW
201 WILBON ROAD 301B
Fuquay-Varina, NC

Roland is about a half mile south of the James Slaughter Rd. site. He is using a dipole antenna in the attic of a retirement village building. He has a very high ambient noise level (S-6) across the 25 and 28 MHz bands, but was receiving the BPL signature signals clearly above that noise level across those bands.

You might ask if my complaint of interference while mobile, some distance from my home, is justified. I contend that it is, for several reasons.

st, amateur radio is a very "mobile" service. Tens of thousands of amateur radio operators have and use high frequency mobile equipment, and we can be found anywhere, using all hf bands, at completely unpredictable times.

Second, the Progress Energy Phase II trials are in very limited area tests. There are no amateur radio operators living inside the neighborhoods being served, though there are several within interference range - about a mile. We are notified in traveling to the sites with normal amateur radio equipment, operated in a normal manner, to observe and complain about interference we receive. This observation must be extrapolated to a wider geographic area to anticipate the kind of interference that would be received if BPL were to be widely deployed, especially in denser suburban and urban neighborhoods.

You might also ask if weak BPL signals constitute harmful interference. I contend that they do. Amateur radio operation is unlike most other radio operation, in that amateurs tune across their band segments looking for signals. Often we are looking for weak signals from distant parts of the world. Our predominant modes are single sideband and CW. In those modes, a series of carriers 1 kHz apart presents a most irritating series of "beat notes" - tones that vary in pitch as the spectrum is tuned. At 1 kHz spacing, they are continuously present in a receiver using customary bandwidth filters. And even weak BPL signals can make weak amateur radio signals difficult or impossible to receive.

The presence of any BPL signal of any strength at either a home or mobile station at any location is an unwarranted incursion in the amateur radio bands, and is also a problem for anyone tuning shortwave broadcast or other radio services.

Thanks for your consideration. I look forward to hearing the results of the investigation into my complaints.

Sincerely,

Jerry Pearce KN4AQ

James Burtie

From: Tom Brown N4TAB [n4tab@earthlink.net]
Sent: Friday, May 14, 2004 10:06 AM
To: James Burtie; Alan Stillwell; Bruce Franca; Riley Hollingsworth; Anh Wride; Len.S.Anthony@pgnmail.com; matt.oja@pgnmail.com; bill.godwin@pgnmail.com; W3KD@aol.com
Cc: Gary Pearce KN4AQ; John Covington, W4CC; Ed Hare W1RFI; dsumner@arri.org; danny hampton K4ITL
Subject: RESEND - May 14, 2004 - Formal complaint - Progress Energy Part 15 devices

To:
 James Burtie, FCC
 Alan Stillwell, FCC
 Anh Wride, FCC
 Riley Hollingsworth, FCC
 Len Anthony, Progress Energy Corporation
 Matt Oja, Progress Energy Corporation
 Bill Godwin, Progress Energy Corporation
 Chris Imlay, ARRL Counsel

Date: April 27, 2004

This complaint addresses the Progress Energy (Raleigh, NC) BPL trial areas situated along James Slaughter Road in southern Wake County, NC. This complaint should be considered in concert with previous complaints lodged with Progress Energy and The Federal Communications Commission regarding interference by devices operating under FCC Part 15 and which radiate harmful interference into the RF spectrum allocated to, and used by licensees of the Amateur Radio Service.

Notwithstanding previous efforts by Progress Energy and its vendor, Amperion, Inc. to resolve outstanding complaints regarding interference to Amateur Radio spectrum, a recent correspondence from Mr. Len Anthony of Progress Energy states that his company's efforts had yielded results suitable to Progress Energy and that they would take no further action in this regard. This correspondence coldly and effectively terminates the good faith relationship that was engendered in October, 2003 with a view toward a cooperative effort that might yield a technical solution to an otherwise mutually adversarial situation.

In assessing the current technical aspects of the Progress Energy BPL trials, I believe that the interference described in this and previous complaints falls under Part 15 for the following reasons:

- 1) The Experimental license WD2XCA issued to Progress Energy (file number 0011-EX-PL-2003-granted February 10, 2003) allows operation of an experimental radiator within a 20 mile radius of the coordinates N35:56:58, W78:34:23. None of the 3 trial sites in southern Wake County are within this radius.
- 2) Mr. Len Anthony's correspondence of April 20, 2004 specifically refers to FCC Rules, Part 15 as their model for compliance.

10/21/2004

Therefore, my complaint is that Progress Energy's BPL trial site(s) emit radiated RF components that are harmful to the spectrum allocated to the Amateur Radio Service by the FCC and also provided under international treaty.

In preface to the specifics of my complaint, I would like to put into perspective, the use of an Amateur Radio HF mobile radio in the trial areas. As it is remarkably convenient that there are only a small number of Amateur Radio operators geographically situated near the trial areas to hear the BPL signals from their homes, we have been, and are, using mobile HF equipment in the place of fixed installations in order to gauge the impact of interference in the respective geographical areas. Thus, an HF mobile radio, in the current context, is a "stand-in" for a fixed station at or near the same geographic location. It should be noted that, due to the generally poor efficiency and polarization of the HF mobile antennas, the results reported herein significantly *under-represent* the signal levels that would be encountered by fixed stations using horizontally polarized antennas, such as wire dipoles or directional arrays, operating in the same vicinity.

On Sunday, April 25, 2004, I drove my vehicle to the James Slaughter Road trial-site area. Upon arrival near the entrance to the Whitehurst residential subdivision, I began tuning through the allocated Amateur Radio bands and immediately observed significant interference to the 12 meter band, which extends from 24.890 MHz to 24.990 MHz. The interference was sufficient to mask, and did mask, useful signals that were clearly heard away from the BPL trial area. That the unique RF "signature" of the Progress Energy equipment completely blankets and renders useless an otherwise useful spectrum segment, clearly constitutes harmful interference.

This interference accrues into other portions of the allocated Amateur Radio HF spectrum, as well. Within the Whitehurst and Woodchase subdivisions (both adjacent to James Slaughter Road) BPL interference can be heard in the lower 25 kHz of the 10 meter band (28.000 MHz to 28.025 MHz).. In addition, near the entrance to the Whitehurst subdivision, the entire 40 meter band (7.000 MHz to 7.300 MHz) is obscured by BPL interference. This interference does not radiate from the overhead wires alone; radiation also occurs from the pedestals where the underground wiring connects to customer distribution equipment.

Note that this interference is not confined to a single, narrow tone (carrier) as would be experienced from a typical Part 15 device such as an answering machine. This BPL interference signature consists of carriers spaced at approximately 1 kHz intervals through the entire 12 meter band, rendering normal communications operation impossible.

Where apparent attempts by Progress Energy to vacate the Amateur Radio spectrum have occurred in these systems, it has become obvious that the characteristics of any built-in "mitigation" filters do not exhibit "sharp" edges and that the "granularity", or precision with which any such filters can be defined and applied, is quite coarse. That is to say, that it seems

at it is not possible to apply a "brick wall" filter topology, cleanly "notching" spectrum segments, rather, the filter "corner" must be set (possibly empirically) considerably away from the desired edge of the spectrum to be avoided. This observation suggests that the oft-touted claims of an "adaptive mitigation" process are overstated, at best.

Members of the local Amateur Community, including the undersigned, have waited patiently for several months while Progress Energy and its vendors have attempted, in fits and starts, to remove the allocated Amateur Radio spectrum from that spectrum utilized by their installed PL systems. The result, after these months of observation, is that Progress Energy has not caused these systems to cease interference to the Amateur Radio spectrum.

There is a single conclusion that can be drawn from the history of this situation: interference from this type of system is a function of the design and cannot be mitigated, else it would have been accomplished by now. Further, it seems that this technology is quite immature and inherently lacking the technological merits so widely accorded it, owing to the lack of success following months of efforts toward effecting a solution.

FCC part 15 rules quoted below state that:

15.5 General conditions of operation.

a) Persons operating intentional or unintentional radiators shall not be deemed to have any vested or recognizable right to continued use of any given frequency by virtue of prior registration or certification of equipment, or, for power line carrier systems, on the basis of prior notification of use pursuant to § 90.63(g) of this chapter.

b) Operation of an intentional, unintentional, or incidental radiator is subject to the conditions that no harmful interference is caused and that interference must be accepted that may be caused by the operation of an authorized radio station, by another intentional or unintentional radiator, by industrial, scientific and medical (ISM) equipment, or by an incidental radiator.

c) The operator of a radio frequency device shall be required to cease operating the device upon notification by a Commission representative that the device is causing harmful interference. Operation shall not resume until the condition causing the harmful interference has been corrected.

Progress Energy is operating equipment under the terms of Part 15.5a, b and c above, and is subject to the restrictions therein.

Therefore, respectfully demand that the Federal Communications Commission

like the action specified under Part 15.5c and cause Progress Energy to ease operation of the Part 15 devices mentioned in this correspondence.

Respectfully,

Thomas A. Brown Amateur Radio licensee N4TAB
525 Old Still Rd.
Wake Forest, NC
919-556-8477 (w)
919-528-3104 (h)
n4tab@earthlink.net

Attachments:

Previous complaints made to Progress Energy
Previous complaints made to the FCC
Copy of Mr. Len Anthony's email as referenced above

Revision note: Paragraph 9 had two typographical errors that were subsequently mentioned in a follow-on errata email. Corrections were made in the foregoing paragraph 9 (only) and are underlined in both cases.}

interference complaint regarding Progress Energy Phase II BPL

used a "beat note" against the 15 MHz WWV time and frequency reference signal.

I have subsequently been through this area several times, and the interference is still present. My last visit was on February 28th.

February 20, 2004. On this and several subsequent dates, I received interference while driving along NC Highway 55 and James Slaughter Rd, just north of the town of Fuquay-Varina. The interference was strongest along James Slaughter Road, opposite the Woodchase subdivision. Again, the signature of the interference was RF carriers, about 1 kHz apart, with a bit of digital modulation now and then, including the tik-tik-tik at about a 2 Hz rate.

This interference was across 21.9-25.7 MHz (including the amateur radio 12 meter band) and 27.5-30.0 MHz (including the amateur radio 10 meter band). The interference was S-9 along James Slaughter Road, and S-5 in the Wood Lion parking lot at NC-55, and obliterated several amateur radio signals that I was monitoring.

In the Woodchase subdivision, I also heard the "BPL signature" signals on several other points in the high frequency spectrum. The signals were weaker, but plainly audible. I also heard signals in the 7 and 24.5 MHz area about a mile further north on James Slaughter Road, near the Whitehurst subdivision. These signals were S-6 to S-9 for about 1/4 mile along James Slaughter Road.

I most recently heard this interference on March 5th, 2004.

Finally, on February 28, 2004, I personally visited the homes of three amateur radio operators who live in the vicinity of the Progress Energy Phase II BPL trials, and observed interference as received at their stations as follows:

Mike Payne KM4UT
313 HEATHILL CT
Raleigh, NC

Mike lives .7 miles south of the trial site on Holland Church Road. He is using a dipole antenna at about 30 feet. I observed that he was receiving a clear but weak BPL "signature" in the top half of the 10 meter band, above 28.8 MHz, and many smaller clusters of individual carriers in the band below that.

Ed Root N1UJ
109 WYNDHAM DR
Fuquay-Varina, NC

Ed is about a half mile southwest of the James Slaughter Road site. He is also using a dipole antenna at about 40 feet. He was receiving weak but clear BPL signature signals across the 25 and 28 MHz areas.

Holland Erickson WA0AFW
301 WILBON ROAD 301B
Fuquay-Varina, NC

Holland is about a half mile south of the James Slaughter Rd. site. He is using a dipole antenna in the attic of a retirement village building. He has a very high ambient noise level (S-6) across the 25 and 28 MHz bands, but was receiving the BPL signature signals clearly above that noise level across those bands.

You might ask if my complaint of interference while mobile, some distance from my home, is justified. I contend that it is, for several reasons.

First, amateur radio is a very "mobile" service. Tens of thousands of amateur radio operators have and use high frequency mobile equipment, and we can be found anywhere, using all hf bands, at completely unpredictable times.

Second, the Progress Energy Phase II trials are in very limited area tests. There are no amateur radio operators living

side the neighborhoods being served, though there are several within interference range - about a mile. We are notified in traveling to the sites with normal amateur radio equipment, operated in a normal manner, to observe and explain about interference we receive. This observation must be extrapolated to a wider geographic area to anticipate the kind of interference that would be received if BPL were to be widely deployed, especially in denser suburban and urban neighborhoods.

You might also ask if weak BPL signals constitute harmful interference. I contend that they do. Amateur radio operation is unlike most other radio operation, in that amateurs tune across their band segments looking for signals. Often we are looking for weak signals from distant parts of the world. Our predominant modes are single sideband and CW. In those modes, a series of carriers 1 kHz apart presents a most irritating series of "beat notes" - tones that vary in pitch as the spectrum is tuned. At 1 kHz spacing, they are continuously present in a receiver using customary bandwidth filters. And even weak BPL signals can make weak amateur radio signals difficult or impossible to receive.

The presence of any BPL signal of any strength at either a home or mobile station at any location is an unwarranted incursion in the amateur radio bands, and is also a problem for anyone tuning shortwave broadcast or other radio services.

Thanks for your consideration. I look forward to hearing the results of the investigation into my complaints.

Sincerely,

Gary Pearce KN4AQ

Gary Pearce KN4AQ editor, SERA Repeater Journal
Cary, NC www.sera.org
919-380-9944 kn4aq@sera.org
kn4aq@arrl.net
AOL/Yahoo Instant Messenger: KN4AQ
(send e-mail to be put on my "buddy list")

: Len Anthony, Progress Energy Regulatory Affairs

om: Gary Pearce KN4AQ
6 Waterfall Ct.
ry, NC 27513
9-380-9944
4aq@arri.net

ill Godwin, Progress Energy
nh Wride, FCC
mes R.Burtle, FCC
iley Hollingsworth, FCC (FYI)
d Hare, ARRL
rank A. Lynch, ARRL

Monday, March 29, 2004

This e-mail letter is a second formal complaint of interference received from several Broadband over Power Line (BPL) installations operated by Progress Energy in the Wake County, North Carolina area. This complaint covers interference on NEW frequencies that was not present in my first complaint filed on March 13th.

In my March 13th complaint I detailed interference that I observed while operating my mobile amateur radio equipment in the vicinity of the Progress Energy Phase II BPL trial areas in southern Wake County, North Carolina. No one from either Progress Energy or the FCC has contacted me as a result of that complaint (except a request from the FCC to drop David Solomon from the recipient list, which I have done). I have seen Bill Godwin in a somewhat chance encounter at the Holland Church site, and we had a good discussion on the state of the trial.

I have observed that Progress Energy has changed the spectrum used for the overhead line segments in both trial areas. If I'm correctly assuming that this was done to respond to complaints, and demonstrate frequency agility and the ability to mitigate interference by avoiding amateur radio spectrum, the attempt is appreciated, but it was not completely successful. New amateur radio and shortwave spectrum is now receiving interference, and that is the basis of this complaint.

On March 20, 2004, in the Woodchase subdivision area near Fuquay-Varina, where BPL signals had covered the 12 and 10 meter bands, I observed clear, strong BPL signature signals from 21.5 to 24.90 MHz, and 25.49 to 28.0 MHz. This almost cleared amateur radio spectrum, but not quite.

The lower segment, from 21.50 to 24.90 MHz, encroached clearly on the bottom 10 kHz of the 12 meter band, from 24.89 to 24.90 MHz, and what I'll call "residual" BPL carriers - carriers at the edge of the main spectrum that trail off in amplitude over the course of 10 to 20 kHz - encroached further. The residual carriers present a correspondingly decreasing problem of interference, but when the bulk of the BPL carriers are strong, the residual carriers can also interfere with weak amateur radio signals.

Note that if a BPL operator is attempting to place a BPL block adjacent to the bottom of an amateur band, they should be aware that these residual carriers will fall across an area of extreme interest where amateurs use Morse code to

he higher segment, from 25.49 to 28.0 MHz, also left some residual carriers encroaching on the bottom of the 10 meter band at 28 MHz. The main carriers did cover all 40 CB channels and interfered with signals I monitored there.

On March 23, 2004, I returned to the Holland Church Road trial area. That's when I ran into Bill Godwin and two other Progress Energy engineers, observing and reporting on some difficulty that Amperion was having moving the spectrum on the overhead line. The signals were gone from the 12 and 10 meter bands, and appeared erratically elsewhere. Since this was an effort in progress, I didn't worry about the signals I received.

14.29 - 16.805 MHz
17.33 - 21.00 MHz
24.53 - 28.00 MHz (with 12 meter notch?)

After observing what appeared to be an attempt to completely avoid amateur radio spectrum at the Woodchase trial area, I was disappointed to see that two busy amateur radio bands were partially or fully covered here: 20 and 17 meters. The BPL carriers interfered with many signals as I tuned from 14.29 to the band-edge of 14.35 MHz in the 20 meter band. Strong signals were audible, but BPL carriers placed a loud "beat note" behind them, making reception irritating at best. Weaker signals were rendered unreadable.

I also tried listening to some shortwave broadcast signals in the spectrum immediately above the 20 meter ham band. Switching to AM reception with a 6 kHz band pass filter, I noticed that the BPL signals were a continuous "blanket" across the spectrum. Since the BPL carriers were 1.1 kHz apart, I heard the expected 1.1 kHz heterodyne tone as part of that interference blanket.

I could not observe any "residual" carriers spilling into the 15 meter ham band as the "power line noise" made it difficult to hear the weakest BPL carriers. With some difficulty I observed what appeared to be a notch in the 24.53 - 28.0 MHz block. The carriers were at least attenuated in the 24.89 - 24.99 MHz area (the 12 meter ham band), but I thought I could hear some weaker carriers through the "power line noise".

C:\WINDOWS\Internet Settings\Content Advisor\CA.dll 10/21/2004

amateur radio is a very mobile radio service,

these are very limited trial areas, and the experience and results must be extrapolated to predict the effect BPL will have if widely deployed in densely populated areas.

I conclude with an example of truly random interference caused by BPL to a mobile ham who was not part of, or recruited by, our investigation team:

Over the past few weeks I've had an e-mail exchange with Andy Stoy K4MTN, from Wake Forest, NC. Initially, Andy's e-mail sounded like many that Tom Brown N4TAB, Frank Lynch W4FAL and I have received from area hams who suspect that they are hearing BPL interference from areas where none is known to exist. Andy said he had been hearing loud interference - he called it "static" - for months along a half-mile stretch of Falls of the Neuse Road near the Woodfield subdivision. He was describing the Phase I trial area which we believed to have been disconnected, and his description of "static" didn't sound like the BPL signature we're used to.

I pressed him for more specific details, and he finally described the exact location, and the signature sound (closely spaced carriers with a clicking sound) of Amperion's BPL. Tom Brown traveled to the site and confirmed that the Phase I equipment was still operating on the overhead line along Falls of the Neuse Rd. Andy traveled that route daily, and regularly operates on the 10 meter band. He had been receiving interference and loss of communications on that stretch of road since at least last fall, but didn't know what caused the problem until we began publicizing the trials. When he contacted us. He will be filing his own report of interference.

Andy's story may seem isolated, a rare, chance occurrence. It is significant for several reasons. One is that it happened at all, since there is a total of less than two miles of BPL coverage along Wake County highways. Another is that hams don't know what BPL is yet. We've reached a few with our message, but many more have never heard of it. So there may be a few more Andy Stoy's out there who have passed through the existing trials areas, received interference, and didn't know what it was or who to call.

I appreciate the fact that Progress Energy and Amperion are responding to our reports and complaints of interference. I'd prefer to just call them "reports," but public proclamations that "there have been no interference complaints" have pushed us to this formal posture. My goal is to make you (Progress Energy and the FCC) aware of the real conditions for radio amateurs and other HF spectrum users in the trial area so that you can anticipate the level of difficulty you can expect in a broader implementation.

I'd expect that Progress Energy and Amperion could completely avoid amateur radio spectrum in the overhead segments of this limited trial area. I'm surprised that after the first complaints, you moved to occupy different amateur radio spectrum. But even if you had completely missed ham bands in this first move, success in this limited arena is not a good predictor of the ability to mitigate interference in a full system, where you will be constrained to use more spectrum and not re-use spectrum for several line segments. And the question of interference from the underground line segments has not been addressed at all.

Sincerely,

Gary Pearce KN4AQ

KN4AQ's March 13, 2004 complaint, for reference

I encountered all of this interference while mobile, or visiting the stations of other amateur radio operators. I do not

September 16, 2003. I first encountered BPL interference on this date, near the Wakefield subdivision in north Raleigh, North Carolina, on the Falls of the Neuse Road near Wakefield Pines Rd. The interference appeared as a series of closely spaced RF carriers, approximately 1 kHz apart, covering the lower half of the 10 meter amateur radio band, from 28 to near 29 MHz (and some spectrum below that band, including the 40 CB radio channels near 27 MHz). Some of the carriers had a little "tik-tik-tik" sound at about a 2 Hz rate. The interference was strong - S-9 - for about a half mile along Falls of the Neuse Road, and obliterated several amateur radio signals that I was monitoring.

bruary 15, 2004. On this and several subsequent dates, I received interference while driving along Holland Church road between 1010 Road and Pagan Rd. in southern Wake County, specifically in the vicinity of Feldman Dr. The nature of the interference was the same: closely spaced carriers, about 1 kHz apart, some with a tik-tik-tik modulation, and occasionally a longer burst of what sounded like data. The interference covered two blocks of spectrum, from 23.44 - 26.08 MHz (including the amateur radio 12 meter band) and 27.9 - 31.7 MHz, (including the amateur radio 10 meter band). The interference was strong - S-9 - for about a half mile along Holland Church road, and audible in places along Pagan Rd. It obliterated several amateur radio signals that I was monitoring as I drove through the area.

have subsequently been through this area several times, and the interference is still present. My last visit was on February 28th.

This interference was across 21.9-25.7 MHz (including the amateur radio 12 meter band) and 27.5-30.0 MHz (including the amateur radio 10 meter band). The interference was S-9 along James Slaughter Road, and S-5 in the Food Lion parking lot at NC-55, and obliterated several amateur radio signals that I was monitoring.

I most recently heard this interference on March 5th, 2004.

Mike Payne KM4UT
5813 HEATHILL CT
Raleigh, NC

\\fs-0010\20Settings\Temporary%20Internet%20Files\OLH... 10/21/2004